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BULLETIN

OF THE

TORREY BOTANICAL CLUB

APRIL, 1910

The violets of Staten Island

PHILIP DOWELL

(WITH PLATES 11–18)

This list of the native violets growing on Staten Island is the result of several years of intensive study of the plants in the field and in cultivation at home. In the case of some of the hybrid plants, their identity could be established only by thus keeping them under constant observation through at least one season; and so there may be found in violet collections a number of specimens that cannot be identified with any degree of certainty. A number of such specimens from Staten Island are not included in this list.

Violets in general grow well in cultivation, even in a small city lot, like my own garden, but a few do not thrive so well and are less easily grown. In general they retain in cultivation the same characters as in their natural habitat, but those transplanted from moist or shady woodlands have acquired more or less the character of the same species growing naturally in the open. A plant of *V. papilionacea*, for example, transplanted from the Emerson Hill woods, acquired the characteristics of the form that has been described as *V. domestica*.

Acknowledgments are due to Dr. E. Brainerd, to whom we owe so much of our present knowledge of violets, and who kindly examined my earlier collection of violets, and to Dr. Homer D. House, who has presented his extensive collection of violets to the Staten Island Association of Arts and Sciences and thus made it available for general study.

[The BULLETIN for March, 1910 (37: 97–162. *pl. 9, 10*) was issued 31 Mr 1910.]

Key to the Staten Island species of violets

I. *Acaulescent: leaves and flowers directly from underground stems*

- Leaves lobed or deeply cut.
  - Leaves parted into many slender radiating divisions; style not beaked. 1. *V. pedata.*
  - Leaves shallowly or deeply lobed, with a main middle part; style slightly beaked.
    - Plants not hairy, or but slightly so on the upper surface and margin of leaf; capsules green. 2. *V. Brittoniana.*
    - Plants more or less hairy on leafstalks and flower stalks; capsules mottled with purple.
      - Leaves variable, slightly irregularly lobed or deeply parted. 8. *V. palmata.*
      - Leaves, or some of them, three-lobed, the others not lobed. 9. *V. triloba.*
- Leaves not lobed.
  - Petals blue or lavender.
    - Capsules green, on erect stalks.
      - Plants not hairy, or but slightly so on the upper surface and margin of leaf.
        - Leaves broad, pectinately toothed or regularly incised. 3. *V. pectinata.*
        - Leaves broad, crenate, deeply cordate; seeds nearly black. 4. *V. cucullata.*
        - Leaves triangular-ovate, truncate at base, with larger teeth at base. 5. *V. emarginata.*
        - Leaves sagittate or oblong-ovate, narrower than in the preceding. 6. *V. sagittata.*
      - Plants hairy, leafstalk usually not much longer than the blade. 7. *V. fimbriatula.*
    - Capsules usually mottled with purple, on prostrate to ascending stalks.
      - Plants distinctly hairy on leafstalks, or with long hairs on the upper surface of leaf.
        - Flower stalks and leafstalks hairy. 10. *V. sororia.*
        - Upper surface of leaf with rather long hairs, otherwise not hairy, plants low. 11. *V. hirsutula.*
      - Plants not hairy, or only slightly so on upper surface and margin of leaf.
        - Leaves not deeply cordate; capsules often finely hairy, on ascending stalks; auricles of calyx ciliolate, seeds buff. 12. *V. affinis.*
        - Leaves cordate, larger than in the preceding; capsules larger, never hairy; closed flowers at first prostrate; ripe seeds dark. 13. *V. papilionacea.*
  - Petals white, some streaked with purple; plants freely spreading by slender stolons.
    - Blade of leaf hairy on at least one surface.
      - Leaves hairy on the upper surface, otherwise nearly smooth. 14. *V. blanda.*

Leaves not hairy on the upper surface, plant otherwise hairy.	15.	*V. incognita.*
Blade of leaf not hairy on either surface.		
Blades rounded, cordate; seeds small, nearly black.	16.	*V. pallens.*
Blades ovate to ovate-lanceolate; seeds larger, brown.	17.	*V. primulifolia.*
Blades lanceolate to narrowly lanceolate; seeds dark brown.	18.	*V. lanceolata.*
Petals yellow; leaves pale beneath, spreading close to the ground.	19.	*V. rotundifolia.*

II. *Caulescent: with stems above ground bearing leaves and flowers*

Petals yellow.		
Plants decidedly hairy.	20.	*V. pubescens.*
Plants not hairy or only slightly so.	21.	*V. scabriuscula.*
Petals blue.	22.	*V. conspersa.*

Note. — No attempt is made to include the hybrids in the key. In the following list the numbers given without collector's name refer to my own collection. In the case of common species, when only one record is given, it is the earliest complete record I have found.

1. VIOLA PEDATA L. Sp. Pl. 933. 1753

Occasional in the Todt Hill region and in the sandy regions on the west side of the island, rarely elsewhere. Some of the earlier records are: Todt Hill, May 12, 1877, *M. Ruger;* Court House, May 10, 1879, and Kreischerville, June 5, 1879, *N. L. Britton;* Mariner Harbor, May, 1881, *C. O. Thompson.* Specimens with white flowers, Todt Hill, May, 1882, *N. L. Britton,* and Garretsons, May 10, 1890, *G. D. Hulst;* with double flowers, Watchogue, May 11, 1884, *Arthur Hollick;* in blossom Nov. 4, 1883, Tottenville, *Arthur Hollick.* Our plants have the characters of var. *leariloba* DC.

2. V. BRITTONIANA Pollard, Bot. Gaz. **26**: 332. 1898

V. septemloba of authors, not LeConte.

V. atlantica Britton, not Pomel.

New Dorp, May 8, 1876, *N. L. Britton.* Common on the lowlands. It was admitted on the authority of Geo. W. Wright as *V. delphinifolia* Nutt.* in the Flora of Richmond County.†

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* Proc. Nat. Sci. Assoc. S. I. **8**: 39. 10 My 1902.

† By Arthur Hollick and N. L. Britton. Staten Island, 1879.

3. V. PECTINATA Bicknell, Torreya **4**: 129. 30 S 1904; Bull. Torrey Club **32**: 255. *pl. 18.* 27 My 1905

Midland Beach, Sept. 2, 1909 (*6012*). The leaves of these plants need not be confused with the merely toothed leaves that may be developed in the latter part of the season on *V. Brittoniana* hybrids, for the teeth or incisions are regular and distinctive and not irregular or ragged as in the hybrids.

This is a new locality for this species, only four localities having been previously reported.

4. V. CUCULLATA Ait. Hort. Kew. **3**: 228. 1789

Common. A form with bright lavender flowers has been found in a wet grassy dell in the Bloodroot Valley woods, collected June 4, 1905 (*3792*), etc.; also along Moravian Brook, near Red Lane, May 25, 1895, *Wm. T. Davis.*

5. V. EMARGINATA (Nutt.) Le Conte

V. sagittata emarginata Nutt. Gen. **1**: 147. 1818.

V. emarginata Le Conte, Ann. Lyc. N. Y. **2**: 142. 1828.

Found in a piece of woodland bordering South New York No. 3 (Darcey's woods), Aug. 14, 1907 (*5084*), Sept. 19, 1908 (*5575*), Aug. 14, 1909 (*5978*); in the meadow on the east side of Bradley Avenue, May 23, 1909 (*5648*), June 19 (*5716*), Aug. 7 (*5905*), and Aug. 14 (*5963*).

The *V. emarginata* reported in Proc. Nat. Sci. Assoc. S. I. **8**: 39. 10 My 1902, is based on *V. fimbriatula* hybrids, collected by Arthur Hollick, Sept. 23, 1883, on Todt Hill, and May 12, 1890, in the Clove Valley.

This is an extension of the range of the species.

6. V. SAGITTATA Ait. Hort. Kew. **3**: 287. 1789

Common, but not so well represented in earlier collections. The earliest record I find is Brighton Avenue woods, May 26, 1883, *C. O. Thompson.*

7. V. FIMBRIATULA J. E. Sm. Rees Cyclop. no. 38. 1817

V. ovata Nutt. Gen. **1**: 148. 1818.

V. sagittata ovata T. & G. Fl. N. A. **1**: 133. 1838.

This is common, but often mixed with *V. sagittata.* Plants with white flowers have been found near Little Clove Road, May 13, 1904 (*2838*), and Bloodroot Valley, May 6, 1905 (*3691*).

Dr. Arthur Hollick has found the form with white flowers abundant at the Fox Hills golf links.

8. V. PALMATA L. Sp. Pl. 933. 1753

Frequent in woodland regions. The earliest specimen I find collected is sheet *506* in the herbarium of the S. I. Assoc. of Arts and Sciences, collected on Ocean Terrace, May, 1878, *Arthur Hollick*. This species is very variable in form of leaves and hybridizes freely, thus furnishing many puzzling forms, some of which are practically not identifiable.

9. V. TRILOBA Schwein. Am. Journ. Sci. 5: 57. 1822

V. palmata dilatata Pollard, in Britton, Man. 635. 1905. Not Ell.

Tottenville, May 31, 1884, and Ocean Terrace, May 23, 1885, *Arthur Hollick;* Ocean Terrace, Sept. 20, 1903 (*2535*).

I have followed Dr. E. Brainerd in giving this specific rank, but am rather inclined to consider it a subspecies.

10. V. SORORIA Willd. Enum. 263. 1809

Frequent in woodland regions. Richmond Hill, July 30, 1898, *W. T. Davis;* Bradley Avenue meadow, Aug. 14, 1909 (*5969*); Egbertville, Aug. 23 (*6008*), etc.

11. V. HIRSUTULA Brainerd, Rhodora 9: 98. 29 Je 1907

V. villosa Nutt. and recent authors, not Walter.

V. sororia LeConte, and Eaton, not Willd.

Only a few plants of this have been found, in the woods west of Egbertville, June 14, 1908 (*5322*), Oct. 3, 1908 (*5613*), May 31, 1909 (*5684*).

12. V. PAPILIONACEA Pursh, Fl. Am. Sept. 1: 173. 1814

Abundant. A form with white flowers was found on Emerson Hill, May 18, 1907 (*4684*). This was transplanted and bore white flowers the next season. Forms with leaves purplish on the lower side are frequent in spring.

13. V. AFFINIS Le Conte, Ann. Lyc. N. Y. **2**: 138. 1826

This is quite common, but has been apparently overlooked by collectors. The only specimens I find collected by others are: Silver Lake, Sept. 2, 1883, *Arthur Hollick*, one plant mounted on sheet *555*, together with *V. blanda* and *V. pallens*, in the herbarium of the S. I. Assoc. of Arts and Sciences; Watchogue, June 9, 1907, *Wm. T. Davis.* In my own collection I have eighteen numbers, collected at various places on the island, the first of which is from the vicinity of the handkerchief factory, West New Brighton, Apr. 18, 1903 (*2016*), and the last from New Springville, July 19, 1909 (*5865*).

It may be noted here that the plants growing in the open look quite different from woodland plants, but the latter, when transplanted into the open, acquire the appearance of plants growing naturally in the open.

14. V. LANCEOLATA L. Sp. Pl. 934. 1753

Common. South Shore, May 6, 1866, *W. H. Leggett* (*?*); New Dorp, May 8, 1876, *N. L. Britton.*

15. V. PRIMULIFOLIA L. Sp. Pl. 934. 1753

Common. South Shore, May 6, 1866, West Side, July 22 1869, and Huguenot, Aug. 8, 1870, *W. H. Leggett.*

16. V. PALLENS (Banks) Brainerd

V. rotundifolia β pallens Banks, Prodr. **1**: 295. 1824.
V. pallens Brainerd, Rhodora **7**: 247. 31 D 1905.

Frequent. Originally included under *V. blanda.* South Side, May 6, 1866, *W. H. Leggett* (*?*); Rossville, May 21, 1882, *N. L. Britton.*

17. V. INCOGNITA Brainerd, Rhodora **7**: 248. 31 D 1905

Dr. E. Brainerd has pronounced a number of my specimens from Staten Island as belonging to this species, but the only specimens of which I can be reasonably sure are some collected at South New York No. 3, Aug. 14, 1909 (*5975*). The others are not like the *V. incognita* of the north woods.

18. V. BLANDA Willd. Hort. Berol. *pl. 24.* 1806

V. amoena LeConte, Ann. Lyc. N. Y. **2**: 144. 1828.
V. Leconteana G. Don, Gen. Syst. **1**: 324. 1831.
V. blanda palustriformis A. Gray, Bot. Gaz. **11**: 255. 1886.

Common about ponds and in wet places in woodlands. South Side, May 6, 1866, *W. H. Leggett* (*?*); Egbertville, May 8, 1876, *N. L. Britton;* Martling Pond, Sept. 17, 1904 (*3421*).

19. V. ROTUNDIFOLIA Michx. Fl. Bor.-Am. **2**: 150. 1803

"Near New Springville," July 22, 1899, *Wm. T. Davis;* same place (Bulls Head), Oct. 15, 1905 (*4292*), Apr. 29, 1906 (*4313*), June 10, 1906 (*4378*).

20. V. PUBESCENS Ait. Hort. Kew **3**: 290. 1789

Frequent. The *V. striata* in the Flora of Richmond County was reported on the authority of Geo. W. Wright, based on specimens of *V. pubescens* collected at Garretsons, May 27, 1876, and at West New Brighton, May 15, 1879, *N. L. Britton;* also at Silver Lake, April 28, 1878, *Arthur Hollick.*

21. V. SCABRIUSCULA (T. & G.) Schwein.

V. pubescens scabriuscula T. & G. Fl. N. Am. **1**: 142. 1838.
V. scabriuscula Schwein. T. & G. Fl. N. Am. **1**: 142. 1838.

Frequent. Barrett's Dye Works, May 26, 1879, *Arthur Hollick.*

22. V. CONSPERSA Reichenb. Pl. Crit. **1**: 44. 1823

(?) *V. labradorica* Schrank, Denkschr. Bot. Gesell. Regensb. **2**: 12. 1818.
V. Muhlenbergii Torr. Fl. U. S. **1**: 256. 1824.
V. canina Muhlenbergii Traut. Act. Hort. Petr. **5**: 28. 1877.

Reported as *V. canina sylvestris* Regel in Flora of Richmond County. Frequent in low ground in woodlands regions. Clove Lake, May 14, 1876, *N. L. Britton.*

HYBRIDS, ARRANGED IN ALPHABETIC ORDER

23. **Viola affinis × Brittoniana** hyb. nov.

Glabrous, excepting a slight puberulence on the upper surface and margin of leaf. Blade of leaf deltoid, with a broad shallow sinus, 2.5–7 cm. long and the later leaves as broad, on petioles two or three times as long; margin cut about midway to the midvein into falcate lobes, the basal lobes broad and incised, the median lobe terminating the blade with a blunt apex. Scapes of blue flowers about equaling the petioles; auricles of calyx ciliolate, short and appressed or long and spreading; cleistogamous capsules green or purplish, finely puberulent or glabrate, about 1 cm. long, on ascending or erect slender peduncles about half as long as the petioles; seeds buff. (PLATE 11.)

In their vernal stage these plants resemble *Viola Brittoniana*, but the leaves are less deeply cut. The long-auricled calyx of the cleistogamous flowers shows also the relationship to this species. On the other hand the purple-mottled and puberulent capsules are unmistakable evidence of the relationship to *V. affinis*.

South Avenue, near Lambert Lane, June 9, 1907 (*4768*, type), transplanted and grown in garden for two seasons; Palmer Tract, Port Richmond, May 8, 1906 (*4321*), transplanted and grown for three seasons; near pond on South Avenue, May 29, 1909, transplanted and specimens taken June 20 (*5736*) and Aug. 12 (*5951*); Bradley Avenue, Aug. 7, 1909 (*5903*), also transplanted.

24. V. AFFINIS × CUCULLATA Brainerd, Rhodora **8**: 49. 27 Mr 1906

South New York No. 3, Sept. 19, 1908 (*5574a*); Egbertville, May 9, 1908, transplanted and specimens taken Sept. 26 (*5600*). Here probably belong also: Bradley Avenue, May 21, 1905 (*3728*), and Merrell Avenue and South Avenue, May 6, 1906 (*4318*).

25. **Viola affinis × fimbriatula** hyb. nov.

Young plants pubescent, older plants much less pubescent. Vernal leaf-blades oblong-ovate to broadly ovate, obtuse or acutish, subcordate or truncate, crenate, or irregularly toothed toward the base, densely ciliolate, 2.5–4 cm. long, 1.5–3 cm. wide, on slender petioles two to three times as long; aestival leaves deltoid to ovate, with the apex more acute, 3–9 cm. long, 2.5–6 cm. wide. Blue flowers overtopping the leaves, their calyx-lobes short and blunt, ciliolate, with short appressed ciliolate auricles; cleistogamous flowers sagittate, with longer and more spreading ciliolate auricles, on erect or ascending peduncles; capsules green or mottled with purple, puberulent or glabrous, 6–11 mm. long, in some plants entirely sterile; seeds buff to brown. (PLATE 12.)

Young plants resemble the corresponding cross with *V. papilionacea;* older plants show more the leaf character of *V. affinis.*

Emerson Hill, May 18, 1907 (*4683*, type), transplanted and specimens again taken Sept. 29 (*5239*); South New York No. 3 (Darcey's woods), May 11, 1907 (*4672*), transplanted and specimens again taken Sept. 29, 1907 (*5235*), and Aug. 6, 1909 (*5897*); Ocean Terrace, May 25, 1907 (*4713*), transplanted and specimens again taken Sept. 29 (*5243*); Egbertville, Oct. 3, 1908 (*5617*); New Springville, July 19, 1909 (*5866*).

26. **Viola affinis × hirsutula** nom. nov.

V. affinis × *villosa* Brainerd, Rhodora **8**: 56. 27 Mr 1906.

Rootstock fleshy, erect. Plant rather low, glabrous except the upper surface and margin of leaf, which has the characteristic pubescence of *V. hirsutula.* Blades of leaves broadly ovate to deltoid-ovate, acutish, but with a blunt tip, deeply cordate to nearly truncate at the base, 4–9 cm. long, 3.5–5 cm. wide, on slender petioles about twice their length, margin crenate-serrate with low teeth. Ripe but rather infertile capsule glabrous, about 7 mm. long.

Only one little plant of this was found on the island, in the woods west of Egbertville, Aug. 23, 1909 (*6005*). This was in the little patch of *V. hirsutula*, with plenty of *V. affinis* growing near.

The change in the name of the hybrid is due to the fact that *V. hirsutula* Brainerd takes the place of *V. villosa* of authors, not Walt.

27. **Viola affinis × palmata** hyb. nov.

Plant with scattered pubescence, intermediate in general appearance between the woodland form of *V. affinis* and *V. palmata.* Rootstock rather slender. Blades of leaves broadly triangular-ovate, 6–9 cm. long, 7–10 cm. wide in fully developed leaves, on slender petioles two to three times as long; apex obtusish, base with a broad sinus; margin ciliolate, irregularly toothed or shallowly lobed. Cleistogamous capsules purple-mottled, slightly puberulent, about 7 mm. long, on short ascending peduncles; calyx-lobes purplish, short, blunt, with short ciliolate auricles; seeds brown. (PLATE 13.)

One small colony was found in the woods west of Egbertville, Oct. 3, 1908 (*5615*), and one plant removed to my garden.

28. V. AFFINIS × PAPILIONACEA House, Rhodora **8**: 119. 28 Jl 1906

Richmond, July 11, 1906 (*4487*); Palmer Tract, Port Richmond, May 18, 1907 (*4682*), transplanted and specimens collected Sept. 29, 1907 (*5238*), and Aug. 6, 1909 (*5900*); South New York No. 3, Aug. 14, 1909 (*5979*, *5980*), and Oct. 2, 1909 (*6071*). Probably also: Egbertville, July 3, 1907 (*5006a*), and Aug. 23, 1909 (*6003a*); Bradley Avenue, Aug. 14, 1909 (*5968*).

29. V. AFFINIS × SAGITTATA Brainerd, Rhodora **8**: 55. 27 Mr 1906

Palmer Tract, Port Richmond, May 18, 1907 (*4681*), transplanted and specimens collected Sept. 29 (*5237*); May 15, 1909, transplanted and specimens collected Aug. 6 (*5899*) and Aug. 12 (*5953*, *5954*). A specimen collected in a meadow west of Richmond, Aug. 23, 1909 (*6001*), probably belongs here.

30. V. AFFINIS × SORORIA Brainerd, Rhodora **6**: 221. 30 N 1904

Egbertville, May 31, 1909 (*5681a*), and Aug. 23 (*6004*); Bradley Avenue, Aug. 14, 1909 (*5968*).

31. V. BRITTONIANA × CUCULLATA House, Bull. Torrey Club **32**: 255. *pl. 17.* 27 My 1905

V. notabilis Bicknell, Torreya **4**: 131. 30 S 1904.
V. cucullata × *septemloba* Brainerd, Rhodora **8**: 52. 27 Mr 1906.

Palmer Tract, Port Richmond, May 8, 1906 (*4321*); New Dorp, June 8, 1907 (*4750*), transplanted and specimens again taken Sept. 29, 1907 (*5248*); Bradley Avenue, May 23, 1909 (*5656*), transplanted and specimens again taken Aug. 12 (*5952*). Collected also at New Dorp ("Meadow near Egypt Island"), June 8, 1907, *Wm. T. Davis*, at the same time and place as my *4750*.

32. **Viola Brittoniana** × **fimbriatula** nom. nov.

V. Mulfordae Pollard, Proc. Biol. Soc. Wash. **15**: 203. 1902.
V. fimbriatula × *septemloba* Brainerd, Rhodora **8**: 51. 27 Mr 1906.

Vernal plants resembling *V. Brittoniana;* differing in having peduncles and petioles pubescent, calyx-lobes ciliolate, middle lobe of leaf longer. Aestival plants differing from *V. Brittoniana* in having larger leaves, with the middle lobe prominent, blades pubescent, on petioles about twice as long as blades. Cleistogamous capsules green, 12 mm. long, with some of the ovules abortive; seeds brown.

New Dorp, May, 1893, *N. L. Britton;* June 8, 1907 (*4751*); Bradley Avenue, May 23, 1909 (*5657*), transplanted and specimens again taken Aug. 12 (*5955*).

The change in name is due to the fact that *V. Brittoniana* takes the place of *V. septemloba* of authors, not LeConte.

33. **Viola Brittoniana × papilionacea** hyb. nov.

Slightly pubescent on the upper surface and margin of leaves, otherwise glabrous, 1.5–3 dm. tall. Rootstock fleshy, short, erect or ascending. Vernal leaves purplish beneath, ovate, obtuse, crenate or lobed; aestival leaves ovate to broadly triangular-ovate, irregularly toothed, or cut into falcate toothed or incised lobes, apex acute or obtuse, base cordate to truncate, blades 4–8 cm. long, 3–11 cm. wide, on petioles about three times as long. Petaliferous flowers large, the beard on lateral petals not strongly knobbed, peduncles equaling or shorter than the petioles; cleistogamous flowers sagittate, on short decumbent or ascending peduncles; capsules greenish, mottled with purple, about 1 cm. long; seeds as in *V. Brittoniana.* (PLATE 14.)

In its vernal stages it resembles the corresponding crosses with *V. affinis* and *V. cucullata*, but later its cleistogenes serve to determine its relationship without doubt. A large vigorous clump was found in a meadow on the east side of Bradley Avenue, May 23, 1909 (*5658*), transplanted, and specimens collected July 24 (*5892*), Aug. 6 (*5901*), and Aug. 12 (*5950*, PLATE 14). A small plant was found at Great Kills, May 8, 1909, transplanted and specimens taken Aug. 12 (*5949*). The latter differs from the Bradley Avenue specimens in its smaller size, the later leaves less deeply cut, the calyx-lobes and auricles shorter, the capsules more purple, and the seeds dark, thus more approaching *V. papilionacea* in its later stage; while in its early stage it showed no marked differences from the other plants, except its smaller size.

34. V. BRITTONIANA × SAGITTATA House, Rhodora **8**: 120. 28 Jl 1906

V. sagittata × *septemloba* Brainerd, Rhodora **8**: 51. *pl. 66.* 27 Mr 1906.

Oakwood, Sept. 1897, *N. L. Britton;* New Dorp, near foot of New Dorp Lane, July 29, 1899, and June 8, 1907, *Wm. T. Davis;* New Dorp (with Wm. T. Davis), June 8, 1907 (*4749*); Midland Beach, Sept. 2, 1909 (*6010*); Palmer Tract, Port Richmond, May 17, 1909, transplanted and specimens taken Sept. 12 (*6040*).

35. V. CUCULLATA × FIMBRIATULA Brainerd, Rhodora **6**: 217. 30 N 1904

V. Porteriana Pollard, Bull. Torrey Club **24**: 404. 1897.

Tottenville, Sept. 18, 1898, and Aug. 6, 1899, *Wm. T. Davis;* Bradley Avenue, May 21, 1907 (*4705*), transplanted and specimens taken Sept. 29, 1907 (*5241*); Little Clove Road, June 15, 1907 (*4779a*); Bradley Avenue, Sept. 13, 1908 (*5568*).

36. V. CUCULLATA × PALMATA Brainerd, Rhodora **8**: 56. 27 Mr 1906

Bradley Avenue woods, May 17, 1908 (*5307*), and May 23, 1909 (*5654*); Todt Hill, June 12, 1909 (*5697*).

When we recognize *V. triloba* as a species, these should be classed as *Viola cucullata* × *triloba*.

37. V. CUCULLATA × PAPILIONACEA Brainerd, Rhodora **8**: 56. 27 Mr 1906

Ocean Terrace, May 25, 1907 (*4716*).

38. V. EMARGINATA × FIMBRIATULA Brainerd, Rhodora **8**: 57. 27 Mr 1906

South New York No. 3 (Darcey's woods), Aug. 14, 1907 (*5085*); Bradley Avenue, Aug. 14, 1909 (*5961*, *5965*).

39. V. EMARGINATA × SAGITTATA Brainerd, Rhodora **8**: 58. 27 Mr 1906

Bradley Avenue, Aug. 14, 1909 (*5957–5959*).

40. **Viola fimbriatula × hirsutula** nom. nov.

V. fimbriatula × *villosa* House, Rhodora 8: 121. 28 Jl 1906.

Plant pubescent, low, with erect or ascending rootstock. Leaf-blades thick and firm, dark green above, ovate, acute, cordate, crenate-serrate, ciliate and appressed-pubescent, with the characteristic hairs of *V. hirsutula* on the upper surface; petioles one to two times as long as the blades. The imperfectly developed cleistogenes sagittate, small, on short decumbent or ascending puberulent peduncles; calyx-lobes purplish, lanceolate, with rather long ciliolate auricles. (PLATE 15.)

Woods west of Egbertville, in the *V. hirsutula* patch, Aug. 23, 1909 (*6007*).

41. V. FIMBRIATULA × PALMATA Robinson,
Rhodora 8: 53. 27 Mr 1906

Ocean Terrace, May 25, 1907 (*4712*); Bradley Avenue woods, May 17, 1908 (*5309a*).

42. V. FIMBRIATULA × PAPILIONACEA Brainerd,
Rhodora 8: 54. 27 Mr 1906

Iron Mines, Jewett Avenue, Apr. 25, 1903 (*2021*); Ocean Terrace, Apr. 26, 1903 (*2038*), May 18, 1906 (*4516a*), May 25, 1907 (*4715*), the last transplanted and specimens taken Sept. 29, 1907 (*5245*); Little Clove Road, May 3, 1907, transplanted and specimens collected Oct. 13, 1907 (*5281*); Little Clove Road June 15, 1907 (*4776*).

43. V. FIMBRIATULA × SAGITTATA Brainerd, Rhodora 8: 57.
27 Mr 1906

Rossville, Aug. 6, 1869, *W. H. Leggett* (*?*); Court House, May 10, 1879, *N. L. Britton*; Ocean Terrace, May 10, 1879, *Arthur Hollick*. Common with the putative parents. Where the two species grow together it is difficult to find the pure species unmixed; they cross freely, and the hybrids show marked fertility.

44. V. FIMBRIATULA × SORORIA Brainerd, Rhodora 6: 218.
30 N 1904

New Dorp, June 3, 1897, *A. A. Tyler*; Grasmere, May 29, 1907 (*4720*), transplanted and specimens taken Sept. 29, 1907 (*5246*).

45. V. HIRSUTULA × PAPILIONACEA Brainerd, Rhodora **9**: 98. 29 Je 1907

V. papilionacea × *villosa* House, Rhodora **8**: 121. 28 Jl 1906.
? *V. villosa cordifolia* Nutt. Gen. 148. 1818.
? *V. cordifolia* Schwein. Am. Jour. Sci. I. **5**: 62. 1822.
? *V. villosa cordata* Torr. Fl. U. S. **1**: 252. 1824.

Egbertville, June 14, 1908 (*5322a*), Oct. 3, 1908 (*5611* and *5612*), transplanted and specimens taken Aug. 12, 1909 (*5956*).

46. **Viola hirsutula** × **sororia** hyb. nov.

Dark green, pubescent, 2 dm. tall. Leaf-blades broadly ovate, obtuse, cordate or somewhat reniform, upper surface appressed-pubescent with the characteristic hairs of *V. hirsutula*, lower surface pubescent on the veins; margin ciliate, crenate; petioles ascending, pubescent, one to three times as long as the blades. Cleistogenes not fully developed, small, on prostrate or decumbent peduncles; calyx purplish, with short ciliolate auricles. (PLATE 16.)

This resembles the corresponding cross with *V. papilionacea*, differing chiefly in having pubescent petioles and lower surfaces of leaves. A small colony was found in the *V. hirsutula* patch at Egbertville, May 31, 1909 (*5682*, type), and one plant transferred to my garden.

47. **Viola lanceolata** × **primulifolia** hyb. nov.

Plant taller and more slender than *V. primulifolia*, and in general appearance intermediate between this and *V. lanceolata*. Leaf-blades ovate to lanceolate, acute or obtuse, decurrent on the petiole, margin crenate with low teeth, the points of which are incurved. Early flowers on long slender peduncles equal to or longer than the petioles; capsules green, about 8 mm. long; seeds brown. (PLATE 17.)

Plants collected at Grasmere, May 29, 1907 (*4723*, type), and some transplanted at home, showed the same intermediate character at the end of the season, with a general appearance more like *V. lanceolata* at the end of the season. Other specimens were found on South Avenue, June 9, 1907 (*4760*), transplanted and specimens again taken Sept. 29, 1907 (*5249*); also at Watchogue, Sept. 20, 1908 (*5585*), and from transplanted material Aug. 6, 1909 (*5898*). To this hybrid belong probably also: Tottenville, Sept. 9, 1868, *W. H. Leggett* (?); Watchogue, Sept. 30, 1883, *Arthur Hollick* (sheets *561*, *562*, and *572* in the herbarium of the Staten Island Association of Arts and Sciences); Woodrow, June 22, 1907, *Wm. T. Davis.*

48. **Viola pallens** × **primulifolia** hyb. nov.

Freely stoloniferous, pubescent on the peduncles and petioles, about 2 dm. tall. Leaf-blades pale beneath, ovate, acute or obtuse, subcordate to cordate, crenate with low incurved teeth, 4–6 cm. long and 3.5–5 cm. wide in mature leaves, sometimes as wide as long, on petioles about three times as long. White flowers on long slender peduncles equaling or longer than the petioles; capsules green, 5–8 mm. long; seeds small and dark. (PLATE 18.)

The specimen shown in the plate was taken from my garden Sept. 22, 1908 (*5596*), after having been transplanted from South Avenue, July 25, 1907 (*5059*). This shows a marked resemblance to *V. primulifolia*, and would probably have been so labeled without closer study. It differs from this in its shorter, more ovate and cordate leaf-blades, and in its small dark seeds characteristic of *V. pallens.* Other specimens are: Bulls Head, Aug. 18, 1906 (*4576*); Merrell Avenue, near South Avenue, Sept. 16, 1906 (*4621*), and June 9, 1907 (*4759*); South New York No. 3 (Darcey's woods), May 11, 1907 (*4670*), Aug. 14, 1907 (*5086*), and Oct. 2, 1909 (*6067*); South Avenue near Arlington, June 9, 1907 (*4764*), and from transplanted material Sept. 29, 1907 (*5250*); woods between South Avenue and the fireworks factories at Bulls Head, Sept. 8, 1907 (*5196*); Bradley Avenue, Aug. 14, 1909 (*5972*). Here probably belong also: Watchogue, May 11, 1884, *Arthur Hollick* (sheet *553*); Graniteville, July 16, 1898, *Wm. T. Davis.*

49. **Viola palmata** × **papilionacea** Brainerd, in herb., hyb. nov.

This differs from *V. palmata* in the direction of *V. papilionacea* by the more entire leaves, its scant pubescence, smaller flowers on shorter peduncles, while it resembles *V. palmata* in having irregular shallow lobes on the leaves, the veins prominent, and being more or less pubescent.

Specimens can not be assigned here with absolute certainty on account of the similarity in the fruit of *V. palmata*, *V. papilionacea*, *V. sororia*, and *V. triloba*, but I believe the following belong here: Ocean Terrace, May 23, 1903 (*2127*); Little Clove Road, toward Ocean Terrace, May 13, 1904 (*2839*), and June 15, 1907 (*4777*).

50. V. PALMATA × SAGITTATA Brainerd, Rhodora **8**: 54. 27 Mr 1906

Middletown Forest, June 4, 1905 (*3791*); Bradley Avenue woods, May 21, 1907 (*4706*), transplanted and specimens collected Sept. 29, 1907 (*5242*); Bloodroot Valley woods, Aug. 13, 1907 (*5083*); Egbertville, Oct. 26, 1907 (*5292*), and June 14, 1908 (*5321*).

51. V. PAPILIONACEA × SAGITTATA Brainerd, Rhodora **8**: 54. 27 Mr 1906

Palmer Tract, Port Richmond, May 18, 1907 (*4681*), transplanted and specimens taken June 20, 1909 (*5735*); Emerson Hill, May 18, 1907 (*4687*).

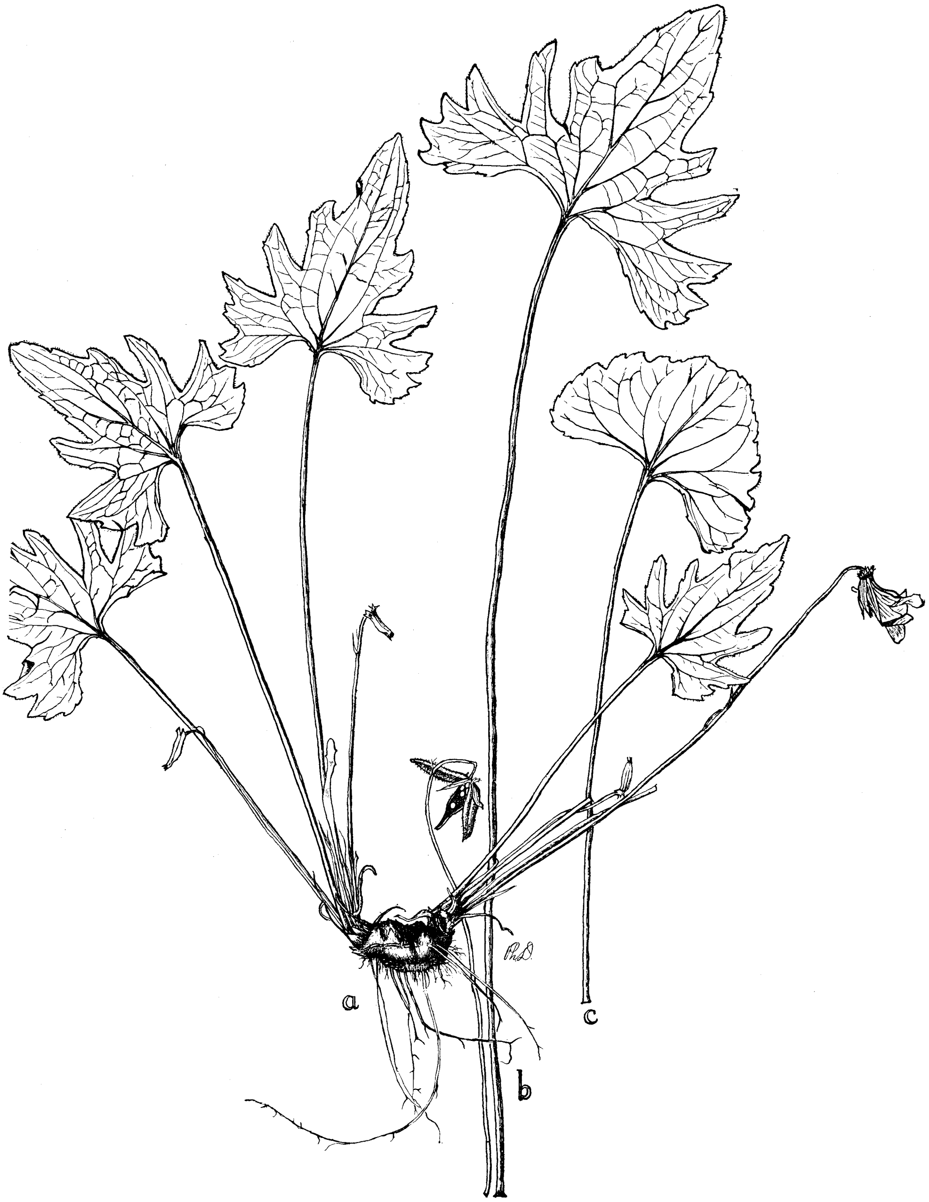
52. **Viola papilionacea × sororia** Brainerd, in herb., hyb. nov.

This differs from *V. sororia* in having longer petioles, thinner leaves, and less pubescence, while it differs from *V. papilionacea* in being decidedly more or less pubescent.

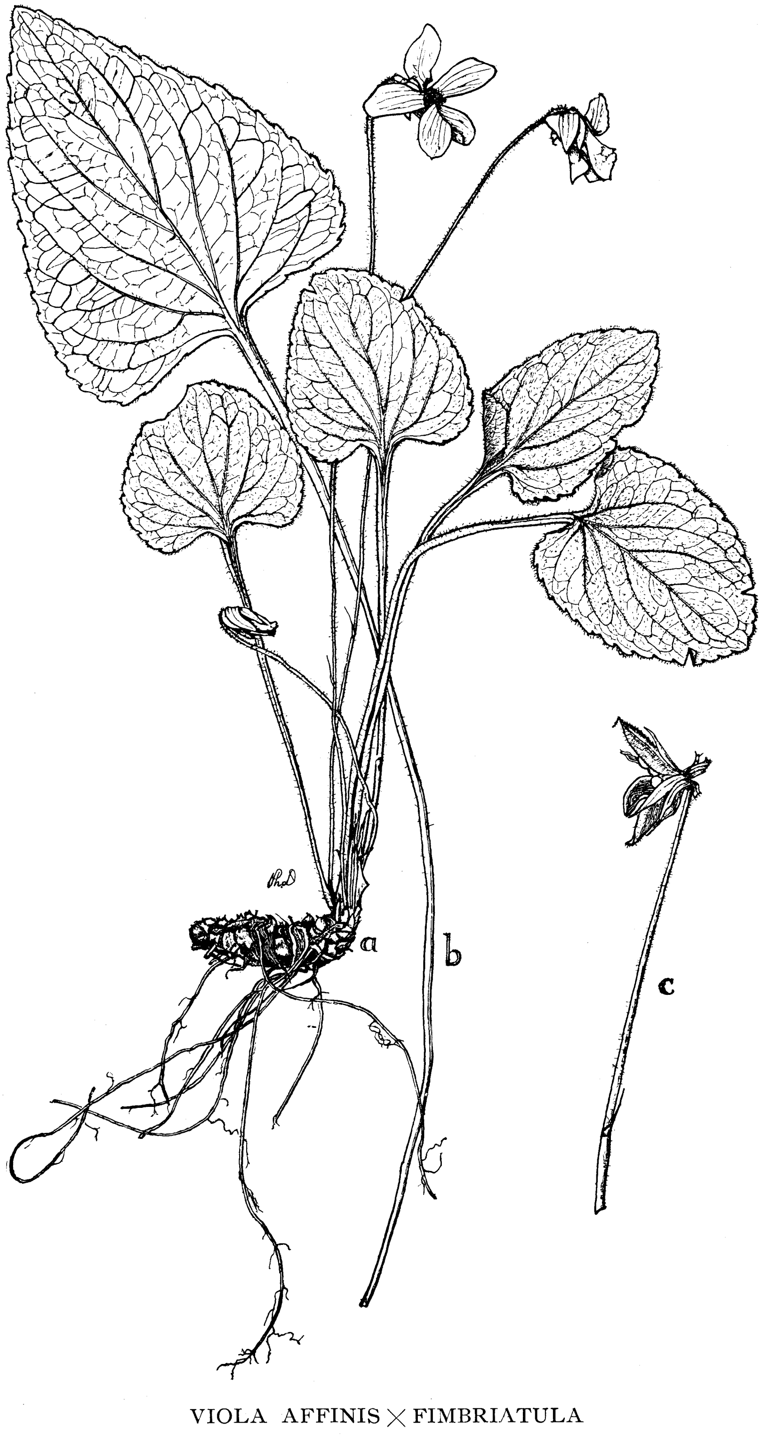
Here are placed the following: Grasmere, May 29, 1907 (*4721*); transplanted and specimens taken Sept. 29, 1907 (*5247*); Emerson Hill, May 18, 1907 (*4685, 4686*); Egbertville, May 31, 1909 (*5681*).

This list does not include all the violet hybrids growing on Staten Island, for I have in cultivation some suspected hybrids, the exact identity of which is not definitely established; but the above list of thirty hybrids is perhaps longer than would be expected. It is not surprising, however, to find so many hybrids, when we consider the fact that the trees are being cut down in the woodlands and the natural surroundings of the plants continually disturbed. It seems that under the changed conditions they hybridize more freely. In this connection it is interesting to note that while it is difficult to find typical *V. hirsutula*, several of its hybrids have been found growing in its immediate vicinity.

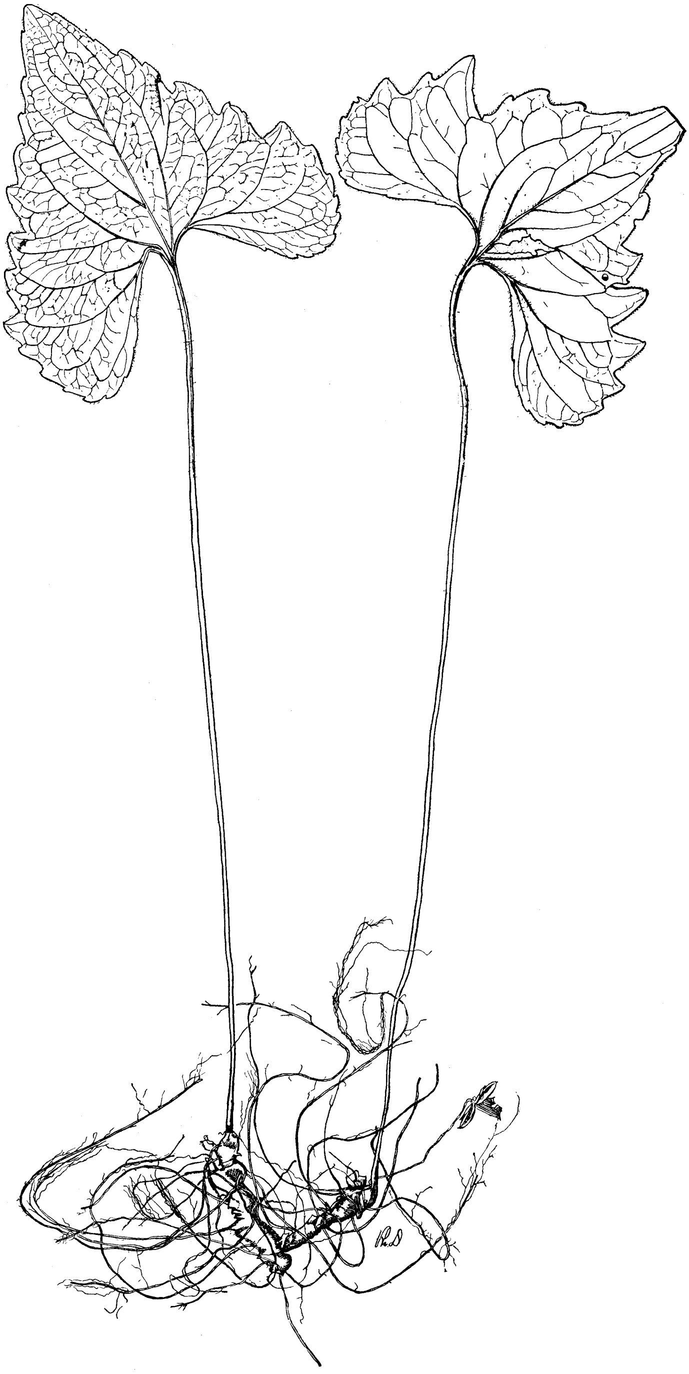
The large number of species found on so restricted an area is partly accounted for by the fact that the terminal moraine crosses



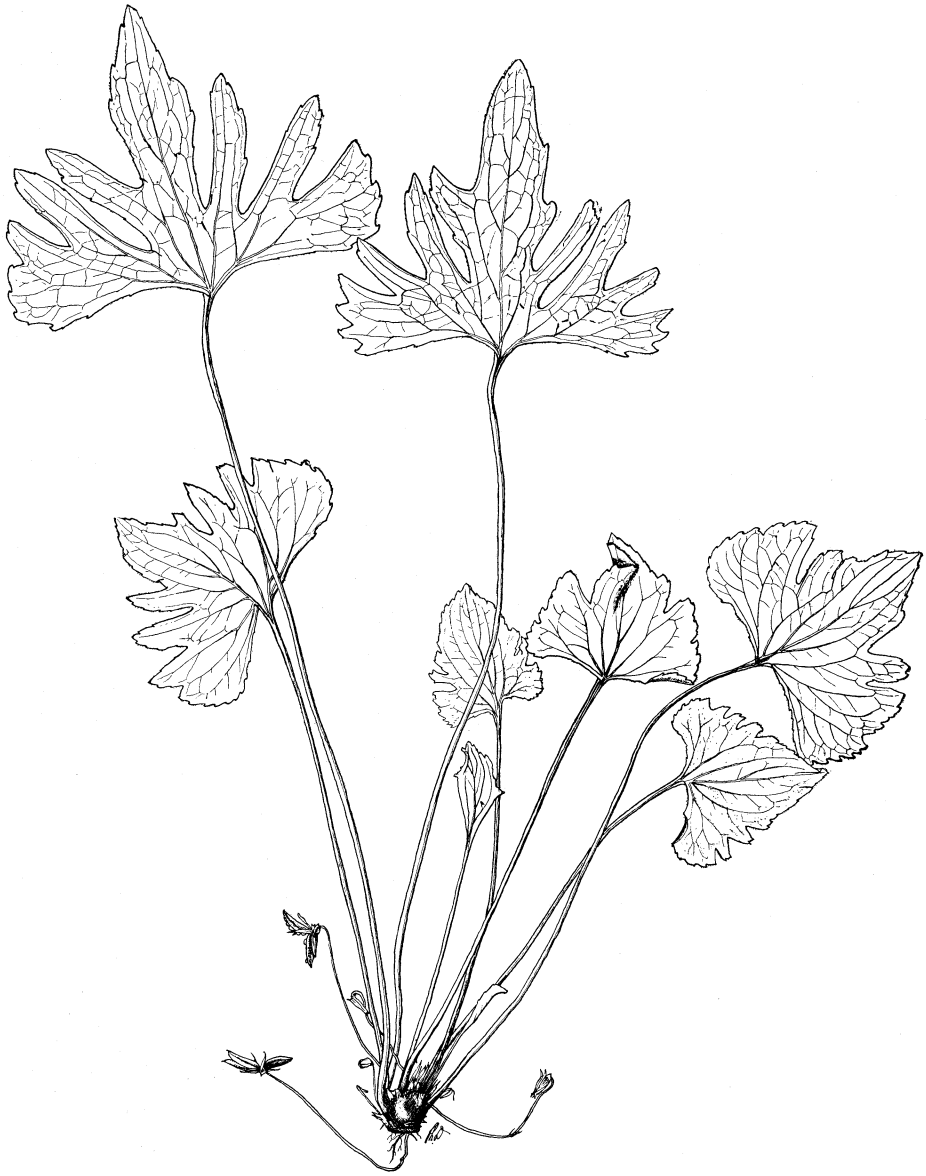
VIOLA AFFINIS × BRITTONIANA



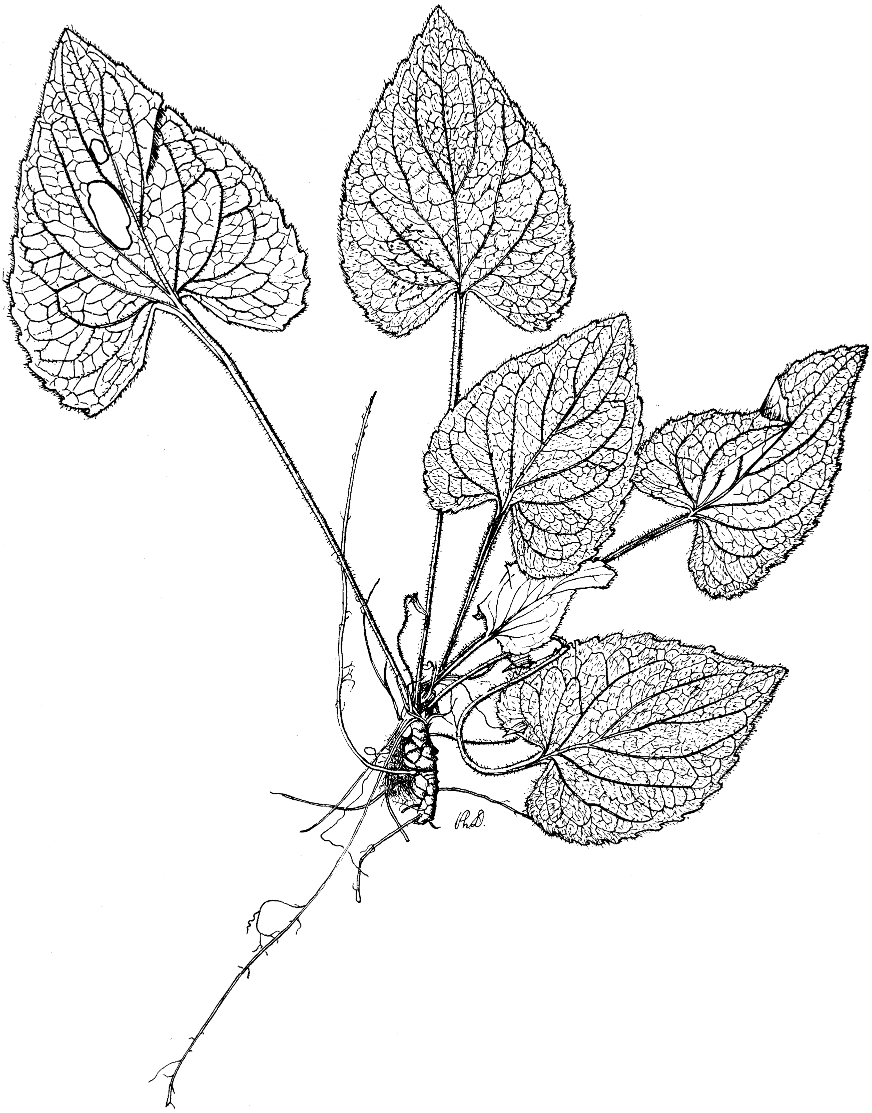
VIOLA AFFINIS × FIMBRIATULA



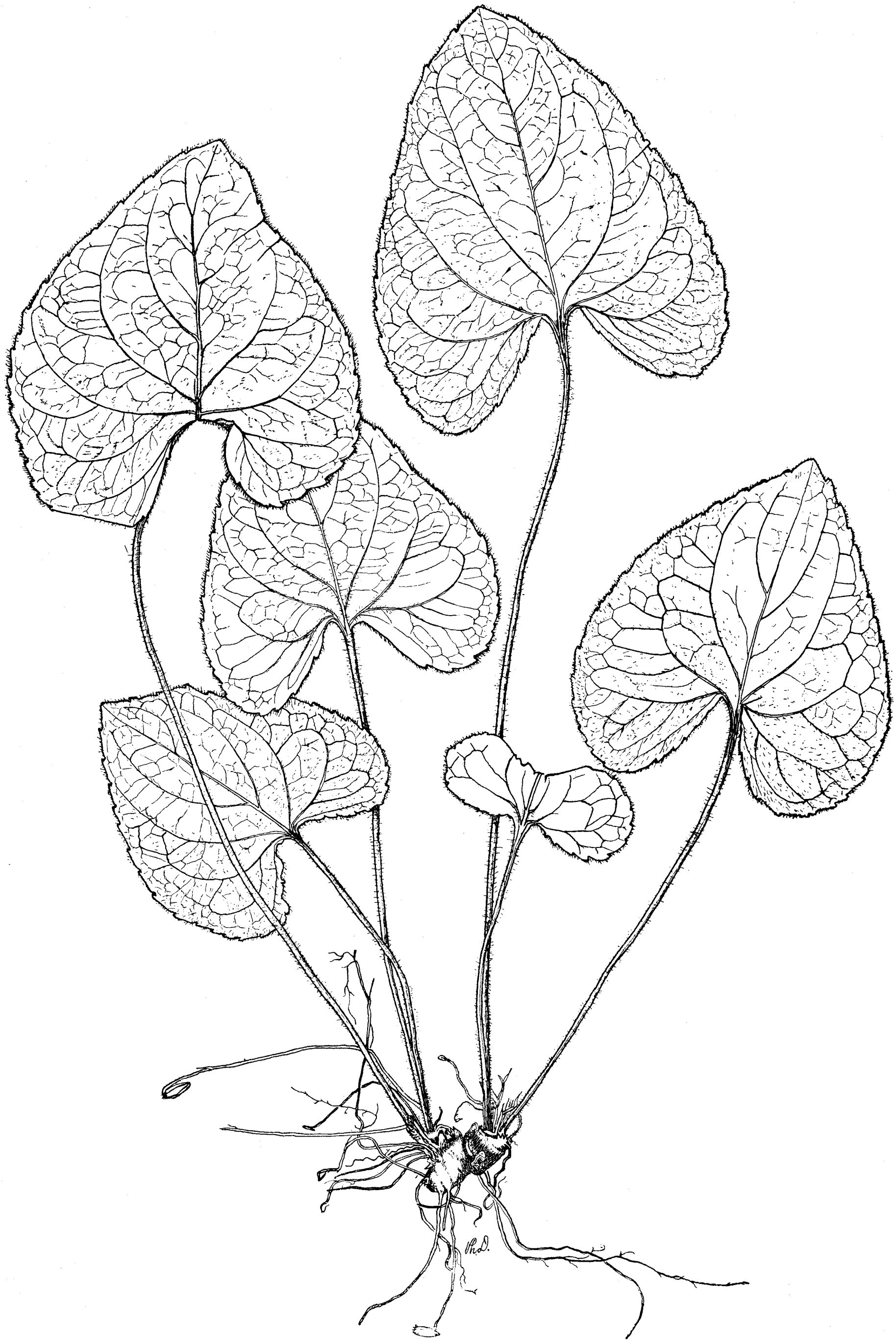
VIOLA AFFINIS × PALMATA



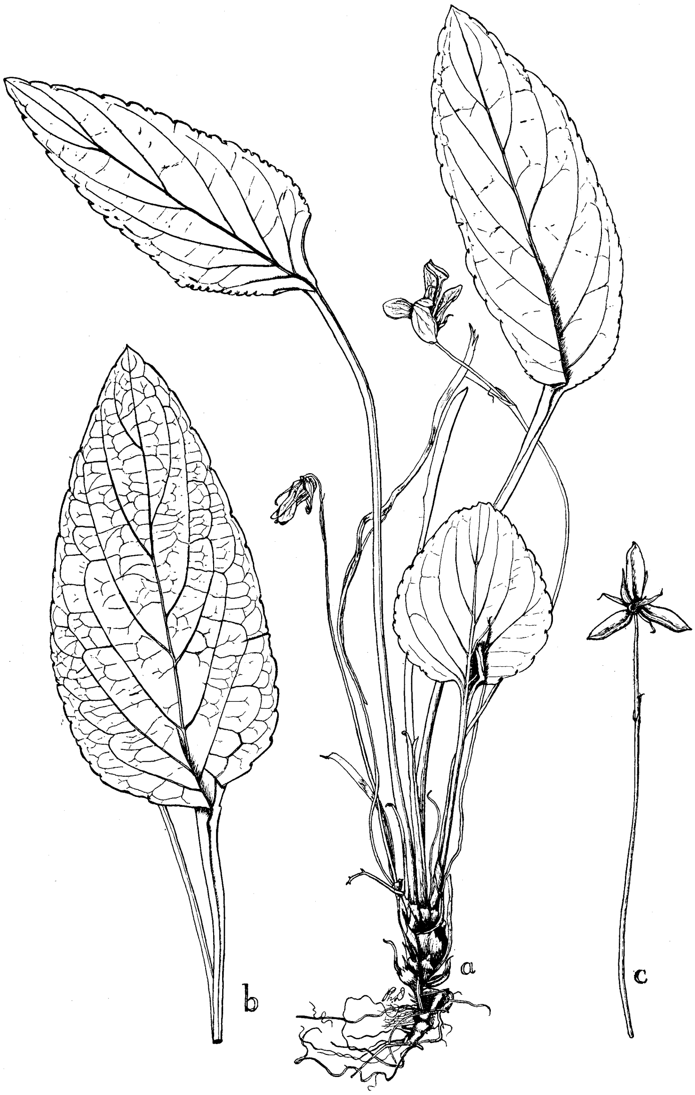
VIOLA BRITTONIANA × PAPILIONACEA



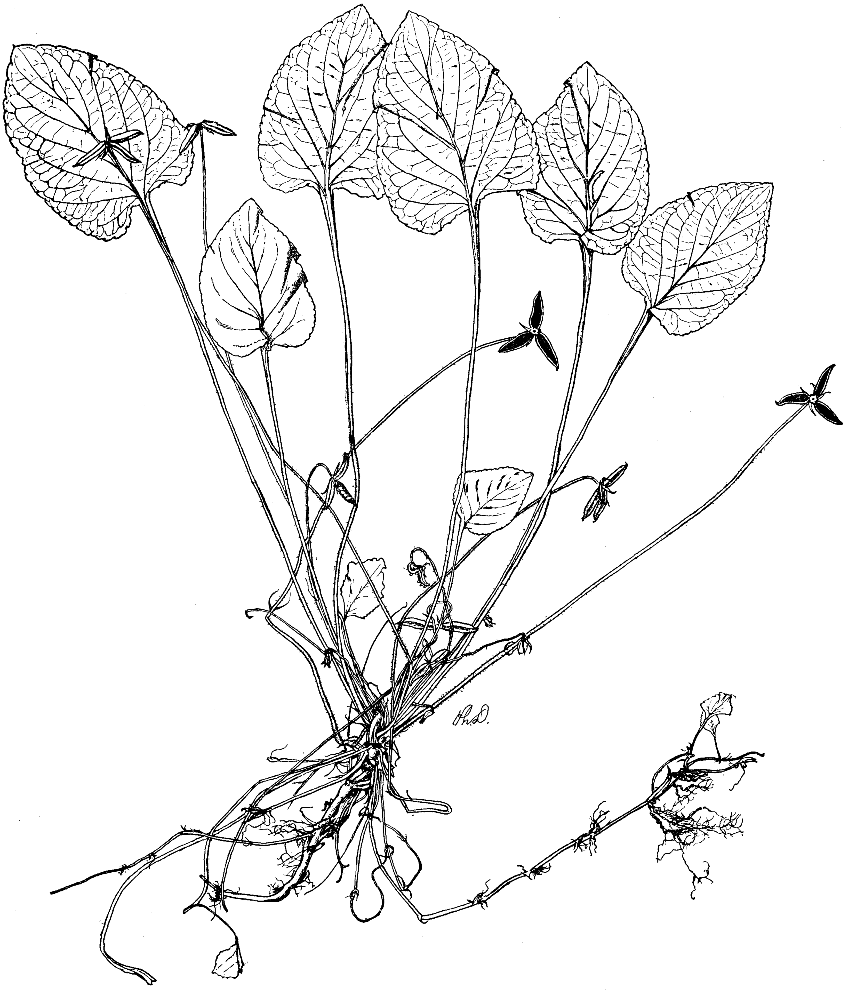
VIOLA FIMBRIATULA × HIRSUTULA



VIOLA HIRSUTULA × SORORIA



VIOLA LANCEOLATA × PRIMULIFOLIA



VIOLA PALLENS × PRIMULIFOLIA

the island and that there are thus two life zones represented. Attention may here be called to *V. rotundifolia* as a remnant of mountain flora growing in the lowlands between Bulls Head and New Springville. In this connection may be mentioned also *Aster acuminatus* Michx., which grows in the same place, near Bulls Head, and at two other places in the low woods towards the west and south.

Since Staten Island is a part of Greater New York, and real estate improvements are continually encroaching on nature, some of the species are scarce, and the localities in which they are found may soon be used for city lots. Thus these species may be exterminated from the island, and their occurrence here will be chiefly of historical interest.

PORT RICHMOND, N. Y.

Explanation of plates 11-18

PLATE 11

Viola affinis × *Brittoniana* Dowell, × $\frac{2}{3}$; *a*, plant collected June 9 (*no. 4768*); *b*, leaf and capsule from specimen collected June 20 (*no. 5736*); *c*, leaf from same plant Aug. 12 (*no. 5951*).

PLATE 12

Viola affinis × *fimbriatula* Dowell; *a*, plant collected May 18 (*no. 4683*); *b* and *c*, leaf and capsule from plant grown in garden, collected Sept. 29 (*no. 5239*); *a* and *b* × $\frac{5}{6}$, *c* × $\frac{5}{4}$.

PLATE 13

Viola affinis × *palmata* Dowell, × $\frac{3}{5}$. (*No. 5615.*)

PLATE 14

Viola Brittoniana × *papilionacea* Dowell, × $\frac{1}{2}$. (*No. 5950.*)

PLATE 15

Viola fimbriatula × *hirsutula* Dowell, × $\frac{2}{3}$. (*No. 6007.*)

PLATE 16

Viola hirsutula × *sororia* Dowell, × $\frac{2}{3}$. (*No. 5682.*)

PLATE 17

Viola lanceolata × *primulifolia* Dowell, natural size; *a*, plant collected May 29 (*no. 4723*); *b*, *c*, leaf and capsule from plant grown in garden, Sept. 29.

PLATE 18

Viola pallens × *primulifolia* Dowell, × $\frac{3}{5}$. (*No. 5596.*)